**Alloys**

**1.** Aluminium alloys are used to make planes and helicopters. Explain the

advantages of using analuminium alloy, rather than pure aluminium, for this

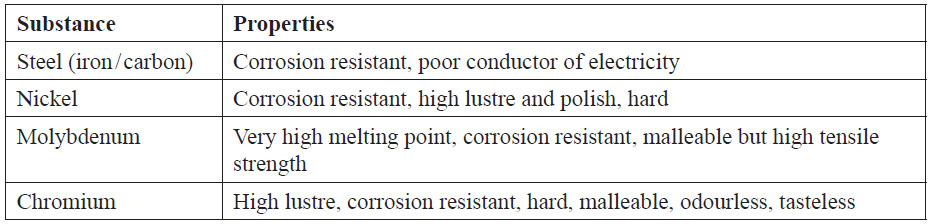
purpose. In your answer, you will need to explain how the structure and

properties of an alloy differ from those of a pure metal. You may use a labelled

diagram to illustrate your answer.

**2.** Body piercing jewellery can be made from an alloy called ‘surgical steel’. Surgical steel is made from steel (iron and carbon) with nickel, molybdenum and chromium.

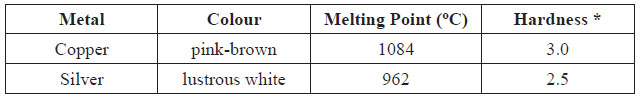
Each of the metals used to make surgical steel, shown in the table below, contributes to its final properties.

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Evaluate why each of the metals listed in the table above is used to make surgical steel alloy suitable for use as body piercing jewellery.

In your answer link ONE physical and ONE chemical property of **each** of these metals to its final use as body piercing jewellery.

**3.** Sterling silver is an alloy made of 92.5% silver and 7.5% copper.



*\* Hardness is measured with Moh’s scale (0 – 10) where 10 is the hardest.*

(i) Describe ONE physical and ONE chemical property of pure **silver** that make it

useful in the production of jewellery and other precious objects.

You may refer to the activity series provided in the resource booklet.

(ii) Analyse the advantages and disadvantages of using sterling silver instead of

pure silver in the production of jewellery and other precious objects.

In your answer you should include physical and chemical properties of each of

the metals used to make sterling silver.

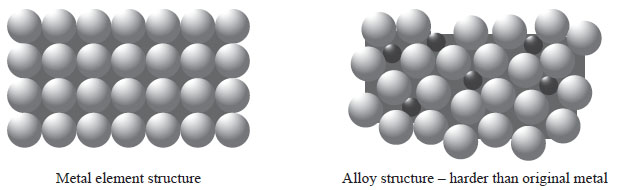
You may refer to the activity series provided in the resource booklet.

**4.** Developing alloys is an important industry worldwide.

(a) Define the term alloy.

(b) Explain why an alloy is **harder** than a metal.

In your answer refer to the diagrams below.



**5.** Alloys often have properties that are different from the properties of the metals they contain. This makes alloys more useful than pure metals alone. For example, an alloy may be harder than the metals from which it is made.

(a) Explain why an alloy may be harder than the metals from which it is made. You may draw a labelled diagram in the box provided to support your answer.

The table below gives some information about TWO alloys of gold.

|  |  |  |
| --- | --- | --- |
| **Alloys of gold** | | |
| **Colour of gold and carat rating** | **Alloy composition** | **Properties** |
| Yellow Gold (18K) | Gold 91.67% Silver 5% Copper 2% Zinc 1.33% | More malleable and ductile than 9K gold.  Yellower than 9K gold.  Tends to look better than 9K gold as the metal ages. |
| Yellow Gold (9K) | Gold 37.5%  Silver 12.1%  Copper 44.4%  Zinc 6% | Usually harder than 18K gold.  Cheaper than 18K gold. |
| (K = carat) | | |

(b) Discuss the use of different alloys of gold by jewellers. In your answer, you should:

explain why both alloys described above are more useful to jewellers than pure gold

justify why a jeweller may prefer to use 18K gold to make a wedding ring but 9K gold to make a delicate necklace.

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